



Joint Research (JR)

September 2016

Crew Training Coordinators (CTC)

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Outline

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- ◆ Proposed JR for I55/56
- ◆ Enhancements for JR
- ◆ Lessons Learned
- ◆ System Areas being Assessed
- ◆ Backup slides

General Overview



- ◆ Joint Research dialog begins between the International Scientists who are interested in sharing results of their investigations. They make requests through their respective ISS science programs.
- ◆ The NASA Program Science Office works with Russian IBMP and TsNIIMash to develop the list of Joint Research Payloads. RSC Energia and representatives from GCTC also attend the TIMs.
- ◆ The following slides are reflective of the type of information that is passed along regarding the payloads that are chosen.
 - ◆ I51- I54 JR was discussed and agreed at the TIM in April 2016 and covered by a signed protocol.
 - ◆ I55/56 JR will be discussed at the TIM in October 2016
- ◆ There is no information on specific JR beyond I55/56. There are program changes which may influence how much JR is done in the future.
 - ◆ Reduction in Russian cosmonauts (from 3 to 2 per increment). TBD start date but expected early 2017.
 - ◆ MLM launch and installation (end of 2017)



Protocol April 2016 (I51-54)



JR proposed training for 50S - 53S (I51-54) is based on April protocol list of science experiments.

NASA-Roscosmos Joint Research Plan

8-Apr-16 Preliminary Increment lists for Long Term Program Integration, Planning, and Training, subject to change with additional agreements as developed.

Times are estimates based on the scientific and Program Manager's agreements.

Actual times will be determined by Joint Planning community.

RUSSIAN CREWMEMBER TIME FOR RESEARCH

Increments	Start	Weeks
51/52	25-Feb-17	27,3

Task	Estimated Hours	Hrs/Wk
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Primary Joint Research

MARES 49S crew (Note 1)	29,50	
MARES 51S crew (TBD-1)	59,17	
Rodent Res. 5, SpX-12: (TBD-5)	40,00	
Cool Flames Investigation Experiments	TBD-3	
ACME Combustion Experiments (TBD-7)	30,00	
Robonaut (TBD-4)	17,00	
SPHERES-ZR (Middle School) (TBD-2)	15,33	
UBNT+Bar	3,00	
EarthKAM (2 sessions) (TBD-6)	6,00	
Total hrs & hrs/wk	200,00	7,33

Increments	Start	Weeks
53/54	8-Sep-17	26,4

Task	Estimated Hours	Hrs/Wk
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Primary Joint Research

MARES 51S crew (TBD-1)	29,50	
Joint Rodent Mission 1, SpX-13: (TBD-5)	100,00	
Rodent Res. 6, SpX-14: (TBD-5)	0,00	
ACME Combustion Experiments (TBD-7)	30,00	
Robonaut (TBD-4)	TBD	
SPHERES-ZR (High School)	16,33	
UBNT+Bar	3,00	
EarthKAM (2 sessions) (TBD-6)	6,00	
Total hrs & hrs/wk	184,83	7,00

Proposed JR for I55/56



Joint Research TIM is planned for October 2016. Below is a preliminary list of payloads for I55/56. (This has not been negotiated with the Russian team so it is very preliminary.)

Increments	Start	Weeks
55/56	27-Feb-18	26.3
Task	Estimated Hours	Hrs/Wk
Primary Joint Research		
MARES 55S crew (TBD-1)	59.17	
Rodent Res. 6, SpX-14: (TBD-5)	0.00	
ACME Combustion Experiments (TBD-7)	30.00	
Robonaut (TBD-4)	TBD	
SPHERES-ZR (Middle School)	15.33	
UBNT+Bar	TBD-X	
EarthKAM (2 sessions) (TBD-6)	6.00	
Total hrs & hrs/wk	110.50	4.20



Other training and JR prerequisites



- ◆ As JR payloads are identified, for NASA payloads, the NASA training team works with other groups who may be impacted. This could be other NASA payloads or systems or International Partners.
 - ◆ Training collaborations can be done via MPTP splinters or other Meeting/telecons as appropriate.
 - ◆ Currently there are ESA and NASA JR payloads
 - ◆ There are no JAXA payloads on the current JR lists
 - ✦ SPHERES sometimes operates in the JEM but does not use any JAXA facilities
 - ✦ A MELFI is located in the JEM and may be used to store JR samples
- ◆ Prerequisites:
 - ◆ Current non-payload JR payload prerequisites are MWA Containment System and the ARIS & PARIS class (alignment guides). CTCs worked with the On Orbit Maintenance group to get those lessons provided for cosmonauts tasked for Cool Flames.
 - ◆ Payload prerequisites include some of the payload racks and hardware.



Enhancing Success

Tools Training & Support

- ◆ Interpreters will be trained on all Joint Research payloads so that they have a better understanding of concepts.
- ◆ Interpreters will be able to support Sims, crew training, and other activities to prepare for Rodent missions.
- ◆ Interpreters will support on orbit operations.
- ◆ All cosmonauts will receive payload rack training beginning with I53/54 crews. (Details in backup slide)
- ◆ Procedures for training and on orbit use are translated – both Russian and English versions will be available.

◆ Crew Training

- ◆ Crew training will be conducted over several US trips in order to build required skills as required for experiments like Rodent Research.
- ◆ Time for interpretation will be added to all classes.
- ◆ Cosmonauts beginning with I53/54 will received payload rack training which will include some exposure to IPV/PODF and Stowage Notes.
- ◆ Cosmonauts will participate in RO Sims where they will be provided extra tools training – refresh and practice using IPV/PODF, OPTIMUS Viewer, Stowage Notes, and calls to POIC in Huntsville. (Lesson learned)



Lessons Learned

NASA payloads training group is working with JSC Systems Instructors and Core Systems Crew Training Working Group to pass along lessons learned. Indications are that more training/practice is needed on some ISS systems and tools.

■ Lessons Learned and Feedback from On-Orbit Operations

- Cosmonauts could benefit from more exposure and practice on:
 - Stowage & Location Codes
 - ODF/OPTIMIS
- More familiarization of the USOS segments and with payload racks would be beneficial

■ Goals

- Goal 1: Ensure each system's initial training contains all fundamentals skills that a cosmonaut needs to successfully execute USOS Payloads ops
- Goal 2: Ensure practice opportunities are sufficient so that a cosmonaut has an acceptable baseline of proficiency when they first start on-orbit payloads

System Areas being Assessed



- ◆ Initial Training (CSCTWG)
 - ◆ Assess areas with “fundamental skills” that may support Payloads (assess possible adds to User training)
 - ✦ On Orbit Maintenance: MWA, ARIS/PARIS, Mating connector caps
 - ✦ P/TV: Proficiency in Identification of US P/TV equipment
 - ✦ I&S: Stowage notes, assessing alternate locations, PMM stowage layout
 - ✦ Crew Systems: Location Coding, power strips
 - ✦ C&T: ATU proficiency, comm protocol for MSFC communication
 - ✦ Daily Ops for OPTIMIS/ODF
- ◆ Proficiency Training (ROWG and Expedition CTOs)
 - ◆ Assess creation of a pick list of USOS Payloads in Routine Ops Sims
 - ◆ Create a list of “system” skills that should be exercised in RO sims and/or consultations (i.e. “fundamental” USOS skills)



Backup

Payload Rack Training



- ◆ Agreement in place to train all cosmonauts on payload racks as follows – beginning with I53/54 cosmonauts:

- ◆ MELFI (.75 Hr.)
- ◆ EXPRESS RACK (1 Hr.)
- ◆ MSG (1 Hr.)
- ◆ HRF RACK (.25 Hr.)
- ◆ HRF Ultrasound 2 (.25 Hr.)
- ◆ HRF Refrigerated Centrifuge (.5 Hr)
- ◆ WOLF (.75 Hr.)

Total for above racks = 4.5 Hrs.

*Approximately 30% interpretation will be added.



Russia/NASA Joint Research



- ◆ Rodent Research
 - ◆ Operator training 21.25 hrs. without interpretation
 - ◆ User training 7.25 hrs. without interpretation
 - ✦ 4 hrs. Rodent Research
 - ✦ 3.25 hrs. support classes
- ◆ Cool Flames & ACME 3.5 hrs. without Interpretation
 - ◆ 2 Hrs. Cool Flames and/or ACME specific
 - ◆ 1.5 Hrs. system prerequisites
- ◆ Robonaut – OBT. No ground training
- ◆ SPHERES-ZR – OBT. No ground training
- ◆ EarthKAM – OBT. No ground training